

SUPPORT FOR THE AMENDMENTS

This Amendment amends Claims 6 and 11. Support for the amendments is found in the specification and claims as originally filed. In particular, support for the Claim 11 limitation "both sides of at least one metal layer is sandwiched between interlayers" is found in the specification at least at Examples 13-17 (a structure comprising one Ag layer that is sandwiched between two interlayers) and Examples 34-37 (a structure comprising two Ag layers, and one Ag layer is sandwiched between two interlayers). No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 2, 6-9, 11, 13-15 and 22 will be pending in this application. Claim 11 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the courtesies extended to their representative during the February 2, 2005, personal interview. As discussed at the personal interview, Applicants have discovered that interposing an interlayer having a refractive index lower than that of titanium oxide between titanium oxide and metal layers actually increases titanium oxide/metal laminate transmission. This is surprising because one would ordinarily expect that adding layers to a laminate would decrease laminate transmission.

In the case of a laminate obtained by laminating a Ag layer and a titanium oxide layer, it has been a problem that its visible light transmittance is lower than expected, as compared with a laminate obtained by laminating a Ag layer and a zinc oxide layer. This problem is considered to be attributable to the following reason. Namely, as described in the specification, upon incidence of light into the laminate, surface plasmon is generated on the

Ag surface, and absorption energy is generated in an ultraviolet region. The present inventors have found that the wavelength region in which the absorption energy is generated depends on the dielectric constant of a dielectric layer being in contact with the Ag layer and that the absorption energy is likely to shift as the dielectric constant of the dielectric layer becomes high (please see the reference documents included with the attached Declaration Under 37 C.F.R. § 1.132). It is known that the dielectric constant of a dielectric layer depends on a refractive index and an attenuation coefficient. In this connection, since the dielectric layer to be used in the present invention is transparent in the visible light region, the dielectric constant depends on the refractive index. Namely, in the case of titanium oxide (refractive index about 2.45), since its dielectric constant is higher than that of zinc oxide (refractive index 2.0), the present inventors have found that the absorption energy tends to shift down to the visible light region, whereby the visible light transmittance tends to decrease in the titanium oxide/Ag laminate. In order to solve this problem, in the present invention, by using the interlayer, it is possible to suppress the shift of the absorption energy of the Ag surface plasmon to the visible light region.

The interlayer of the present invention is not merely an antioxidant layer. Since no difference in the resistance is seen between working examples of the present invention e.g. Examples 48 and 51, and Comparative Example 9 having no interlayer, it is evident that the interlayer does not function as an antioxidant layer. In the present invention, when a titania layer is formed on a Ag layer, the layer is formed by sputtering by using a titanium oxide target in an atmosphere of argon and a very small amount of oxygen. In such a process, the Ag layer is not oxidized. This is evident from the fact also that no difference in the resistance is seen in the comparative examples having no interlayer and the working examples of the present invention. No antioxidant layer is needed in the working examples of the present invention. See attached Declaration Under 37 C.F.R. § 1.132 at section 4.

Claims 2, 6-7, 9 and 11 are rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,948,538 ("Brochot") in view of U.S. Patent No. 5,691,044 ("Oyama").

Claims 7-8 and 15 are rejected under 35 U.S.C. § 103(a) over Brochot in view of Oyama and further in view of U.S. Patent No. 6,045,896 ("Boire").

Claims 7-8 are rejected under 35 U.S.C. § 103(a) over Brochot in view of Oyama and further in view of U.S. Patent No. 6,255,031 ("Yao").

Claims 7-8 are rejected under 35 U.S.C. § 103(a) over Brochot in view of Oyama and further in view of U.S. Patent No. 5,723,075 ("Hayasaka").

Claims 13-15 are rejected under 35 U.S.C. § 103(a) over Brochot in view of Oyama and further in view of U.S. Patent No. 5,595,825 ("Guiselin").

Claims 13-14 are rejected under 35 U.S.C. § 103(a) over Brochot in view of Oyama and further in view of Applicants' Disclosure.

Claim 22 is rejected under 35 U.S.C. § 103(a) over Brochot in view of Oyama and further in view of U.S. Patent No. 54,565.719 ("Phillips").

Brochot discloses a glazing assembly including a barrier layer (i.e., an interlayer) sandwiched between a dielectric layer and a metal functional layer. Bruchot discloses that the barrier layer can be one of a variety of different materials, e.g., at least partially oxidized Nb. Brochot at column 4, lines 10-15; and column 6, lines 49-50. Bruchot discloses that the functional layer can be silver. Bruchot at column 3, lines 38-39.

Brochot discloses that the dielectric layer can be one of a variety of different dielectric materials, e.g., titanium oxide and zinc oxide. Brochot at column 4, lines 16-29.

Any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant increase in titanium oxide/metal laminate transmittance that is achieved in accordance with the present invention by interposing an interlayer having a refractive index lower than that of titanium oxide between titanium oxide and metal layers. See comparative

results in the specification at Tables 1; 2, 4 (Nos. 1-4); 7; 9; 13 (Nos. 1-2); 15 (Nos. 1-2), 16 and 17, which are discussed at page 25, lines 7-21; page 28, lines 11-18; page 37, lines 9-16; page 45, lines 12-21, page 46, lines 20-25; and page 47, lines 19-25.

The attached Declaration Under 37 C.F.R. § 1.132 demonstrates that the increase in laminate transmittance achieved by the present invention by interposing an interlayer between titanium oxide and metal layers is not observed in all dielectric/metal laminates. The Declaration concerns laminates in which the titanium oxide has been replaced with zinc oxide, which is one of the other dielectrics disclosed in Bruchot. The Declaration shows that interposing an interlayer between zinc oxide and metal layers has no effect on laminate transmission. Thus, interposing an interlayer between dielectric and metal layers of a laminate does not inherently lead for all dielectrics to the increase in laminate transmittance achieved by the present invention in titanium oxide/metal laminates.

Brochot and the other cited prior art are silent about increasing transmittance by adding interlayers to laminates.

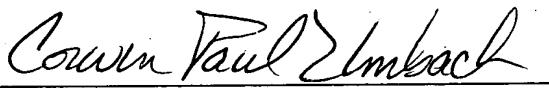
Because the cited prior art fails to suggest the significant increase in laminate transmittance that is achieved in titanium oxide/metal laminates in accordance with the present invention by interposing an interlayer having a refractive index lower than that of titanium oxide between titanium oxide and metal layers, any *prima facie* case of obviousness is rebutted. Thus, the rejections under 35 U.S.C. § 103(a) should be withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon


Corwin P. Umbach
Corwin P. Umbach, Ph.D.
Registration No. 40,211

Attached:

Declaration Under 37 C.F.R. § 1.132

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)
NFO/HAP/cja